Amendment is Proper for Entry

Applicants submit that, as the instant amendment places the application in condition for allowance, entry of the instant amendment after final rejection is appropriate and respectfully requested.

Supplemental Information Disclosure Statement

Applicants submit herewith a Supplemental Information Disclosure Statement which identifies commonly assigned U.S. Patent Application No. 09/769,275 filed January 26, 2001, and the Examiner is invited to review this file and the documents cited therein.

While the instant application is currently under final rejection, Applicants submit that no fee is necessary since no additional prior art document are being identified or cited for consideration by the Examiner. However, if a fee is believed necessary to ensure consideration of the concurrently submitted Supplemental Information Disclosure Statement, the Commissioner is authorized to charge the \$180.00 fee to Deposit Account No. 19 - 0089.

Drawings Revised to More Closely Correspond to Disclosure

Concurrently herewith, Applicants are submitting a Request for Approval of Proposed Drawing Changes in which Figure 3 has been changed to more even more closely correspond to the disclosure in the instant application.

In particular, while Figure 3 indicated that a "square" in the weave pattern constitutes the dimension Az, Applicants note that this is not an accurate depiction of the description. In this regard, the Examiner's attention is directed to paragraph [0056] in which it is

disclosed that

the dimensions of the zones are depicted as Az, which can represent areas of high permeability or areas of low permeability, however, it is not necessary that these dimensions are the same. In any event, Az represents the length and/or width of zones having a permeability different than that of the other zones.

In other words, Applicants submit that Az represents the regions between the shaded portions (squares), which depict the crossing points between the warp and weft threads, and that Figure 3 depicts four (4) areas Az arranged between the shaded crossing points.

Accordingly, Applicants request that the Examiner consider the instant drawing correction and indicate approval of the changes in the next official action.

While Applicants submitted formal drawings with their previous response, upon approval of the instant drawing change, Applicants will prepare and file a new formal drawing corresponding to amended Figure 3.

Traversal of Rejection Under 35 U.S.C. § 102(b)/35 U.S.C. § 103(a)

Applicants traverse the rejection of claims 1 - 8, 11, and 15 - 24 under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over KAMPS et al. (U.S. Patent No. 6,203,663) [hereinafter "KAMPS"].

Applicants' independent claim 1 recites, *inter alia*, a forming region with at least one circulating, continuous dewatering wire, wherein said dewatering wire comprises *at least two zones* having *different wire permeabilities* formed by warp and weft threads and each at least two zones has *at least one dimension of length and width less than 5 mm*. Applicants'

independent claim 11 recites, *inter alia*, forming the tissue web in a forming region of the tissue machine on at least one circulating, continuous dewatering wire comprising *at least two zones* having *different wire permeabilities* formed by warp and weft threads, in which each at least two zones has *at least one dimension of length and width of less than 5 mm*. Applicants submit that KAMPS fails to disclose or suggest at least the above-noted features of the instant invention.

Applicants would like to clarify that the instant invention, in contrast to KAMPS, is not intended or utilized for the purpose of embossing or patterning the forming web. Instead, the recited at least one dewatering wire with zonally different wire permeabilities of the instant invention is arranged to improve web properties such as water absorption capacity, water absorption rate, water retention capacity, specific volume (bulk), (see Specification, paragraph [0004]), which is neither disclosed or suggested by KAMPS. Accordingly, the at least one dewatering wire with zonally different wire permeabilities of the instant invention is provided with small, systematically arranged areas with different wire permeabilities that, when utilized in accordance with the invention, produce a web with constant properties, i.e., uniform properties over the entire web, with regard to the web's usability, i.e., bulk, handfeel, etc. Moreover, as the areas of different permeability in at least one dewatering wire with zonally different wire permeabilities are small, i.e., the dimensions are less than 5 mm, as discussed in paragraph [0012] of the disclosure, a nearly homogeneous web, not the patterned

or textured web formed by KAMPS, is formed.

As noted above, KAMPS is structured to change the appearance of the web, not its physical characteristics. To achieve this goal, KAMPS discloses a forming device that includes forming wires having designs formed on the wire, e.g., silk screened. However, contrary to the features of the instant invention, KAMPS fails to disclose or suggest any apparatus or process that includes at least one dewatering wire comprising at least two zones having different wire permeabilities formed by warp and weft threads and each at least two zones has at least one dimension of length and width less than 5 mm, and that the design is formed as part of a weave pattern, as recited in at least independent claims 1 and 11, as now amended. In fact, Applicants note that KAMPS fails to provide any discussion that the wire includes different zones having different wire permeabilities.

Moreover, while the lacy membrane or patterns formed on the forming wire may have a wire permeability different than the remaining wires of the forming wire, Applicants submit that KAMPS fails to disclose or suggest that the different wire permeabilities are formed by warp and weft threads.

Moreover, Applicants submit that KAMPS certainly fails to provide any disclosure of dimensions of any areas having different permeabilities, as recited in at least the independent claims. However, as KAMPS specifically intends to achieve a patterned or textured web, Applicants submit that KAMPS certainly fails to teach or suggest the recited

dimensions of at least independent claims 1 and 11, which produce a nearly homogeneous, i.e., not patterned or textures, web.

Further, contrary to the instant invention, KAMPS provides an apparatus and process intended to improve an *optical* property, i.e., the appearance, of a tissue web, by embossing or patterning the web with a patterned or embossing forming wire. While the Examiner asserts that the look/appearance of the web can be considered a physical characteristic of the web, Applicants submit that there is no teaching of suggestion in KAMPS that, if modified to include the small areas of different wire permeabilities recited in at least independent claims 1 and 11, the desired pattern or texture would result and/or be visible to change the Examiner's noted "physical" characteristic of the web. Thus, Applicants submit that there is no teaching or suggestion for modifying KAMPS in any manner that would render unpatentable the instant invention.

Because KAMPS fails to disclose at least the above-noted features of the invention, Applicants submit that this document fails to provide an adequate evidentiary basis to support a rejection of anticipation under 35 U.S.C. § 102(b), and that the rejection is improper and should be withdrawn.

Further, because KAMPS fails to provide any teaching or suggestion of affecting the physical properties of the web, Applicants submit that there is no teaching or suggestion to motivate one ordinarily skilled in the art to modify KAMPS so as to include at least two

zones having different wire permeabilities of the recited dimensions. In other words, Applicants submit that, as KAMPS does not recognize the problem addressed by the instant invention, but teaches only the process and device for forming a patterned or textured web, the art fails to provide the requisite rationale for modifying KAMPS in the manner asserted by the Examiner.

Thus, Applicants further submit that KAMPS fails to teach or suggest the combination of features recited in at least independent claims 1 and 11, and that the art fails to provide any suggestion for modifying KAMPS in any manner which would render the instant invention obvious. Therefore, Applicants submit that the rejection is improper and should be withdrawn.

Further, Applicants submit that claims 2 - 8 and 15 - 24 are allowable at least for the reason that these claims depend from allowable base claims and because these claims recite additional features that further define the present invention. In particular, Applicants submit that no proper modification of KAMPS teaches or suggests, *inter alia*, said at least one dewatering wire is provided in an initial dewatering region, as recited in claim 2; a former which includes a forming element and two circulating, continuous dewatering belts, at least one of which comprises said at least one dewatering wire with at least two different wire permeabilities, said two circulating belts being arranged to converge to form a stock inlet nip, and then being guided over said forming element, as an outer belt, which does not come into

contact with said forming element and as an inner belt, wherein at least one of said outer belt and said inner belt comprise said at least one dewatering wire with at least two different wire permeabilities, and a suction device is arranged at a separation point between said two circulating belts in which the tissue web is transferred from said at least one dewatering wire with at least two different permeabilities to the other of said two circulating belts, as recited in claim 3; said forming element comprises a forming roll, as recited in claim 4; said former comprises a double wire former, as recited in claim 5; said former comprises a crescent former, wherein said outer belt is formed by said at least one dewatering wire with at least two different wire permeabilities and wherein said inner belt is formed by a felt belt, as recited in claim 6; said at least one dewatering wire comprises a woven material formed of warp and weft threads, as recited in claim 7; said at least two zones of different wire permeabilities of said at least one dewatering wire are formed by weaving threads of at least one of different diameter and different weaving pattern, as recited in claim 8; using the at least one dewatering wire in an initial dewatering region, as recited in claim 15; the use of a former which includes a forming element and two circulating, continuous dewatering belts, at least one of which comprises said at least one dewatering wire with at least two different wire permeabilities; the two circulating belts being arranged to converge to form a stock inlet nip, and then being guided over the forming element, as an outer belt, which does not come into contact with the forming element and as an inner belt, wherein at least one of the outer

belt and the inner belt comprise the at least one dewatering wire with at least two different wire permeabilities, and a suction device is arranged at a separation point between the two circulating belts in which the tissue web is transferred from the at least one dewatering wire with at least two different permeabilities to the other of the two circulating belts, as recited in claim 16; the forming element comprises a forming roll, as recited in claim 17; the former comprises a double wire former, as recited in claim 18; the former comprises a crescent former, wherein the outer belt is formed by a dewatering wire with at least two different wire permeabilities and wherein the inner belt is formed by a felt belt, as recited in claim 19; the at least one dewatering wire comprises a woven material formed of warp and weft threads, as recited in claim 20; the at least two zones of different wire permeabilities of the at least one dewatering wire are formed by weaving threads comprising at least one of different diameter and different weaving pattern, as recited in claim 21; the at least one dewatering wire is used in a region in which a dry content of the tissue web is less than approximately 20%, as recited in claim 22; the dry content of the tissue web is less than approximately 12%, as recited in claim 23; and the at least one dewatering wire is used in an initial sheet forming region at a dry content less than approximately 6%, as recited in claim 24.

Accordingly, Applicants request that the Examiner reconsider and withdraw the rejection of claims 1 - 8, 11, and 15 - 24 under 35 U.S.C. §102(b)/35 U.S.C. § 103(a) and indicate that the claims are allowable.

Traversal of Rejection Under 35 U.S.C. § 103(a)

1. Over Kamps in view of Kotitschke

Applicants traverse the rejection of claims 9 and 10 under 35 U.S.C. § 103(a) as being unpatentable over KAMPS and further in view of KOTITSCHKE (U.S. Patent No. 5,517,714).

Applicants note that, like KAMPS discussed above, KOTITSCHKE fails to teach or suggest a dewatering wire having at least two zones with different wire permeabilities in which each at least two zones has at least one dimension of length and width less than 5 mm. Moreover, KOTITSCHKE certainly fails to teach or suggest that the different wire permeabilities of the recited dimension are formed by warp and weft threads.

As both applied documents fail to teach or suggest at least the above-noted features, Applicants submit that no proper combination of these documents can render unpatentable the combination of features recited in at least independent claims 1 and 11, as now amended.

Moreover, as neither document provides any suggestion of the problem sought to be solved by the instant invention, i.e., to improve web qualities such a bulk through the use of at least one dewatering wire having at least two zones with different wire permeabilities, in which the areas of different wire permeability are small so produce a homogeneous web, Applicants submit that the art of record fails to provide the necessary motivation or rationale for combining the documents in any manner which would render the instant invention obvious.

Further, Applicants submit that claims 9 and 10 are allowable at least for the reason that these claims depend from allowable base claims and because these claims recite additional features that further define the present invention. In particular, Applicants submit that no proper combination of KAMPS and KOTITSCHKE teaches or suggests, *inter alia*, a conditioning device assigned to said at least one dewatering wire, as recited in claim 9; and said conditioning device comprises a wire cleaning device, as recited in claim 10.

Accordingly, Applicants request that the Examiner reconsider and withdraw the rejection of claims 9 and 10 under 35 U.S.C. § 103(a) and indicate that these claims are allowable.

2. Over Kamps in view of Eaton

Applicants traverse the rejection of claims 12 - 14 under 35 U.S.C. § 103(a) as being unpatentable over KAMPS in view of EATON et al. (U.S. Patent No. 5,225,042) [hereinafter "EATON"].

Applicants note that EATON, too, fails to teach or suggest a dewatering wire having at least two zones with different wire permeabilities in which each at least two zones has at least one dimension of length and width less than 5 mm. Moreover, EATON certainly fails to teach or suggest that the different wire permeabilities of the recited dimension are formed by warp and weft threads.

As both applied documents fail to teach or suggest at least the above-noted features,

Applicants submit that no proper combination of these documents can render unpatentable the combination of features recited in at least independent claims 1 and 11, as now amended.

Moreover, as neither document provides any suggestion of the problem sought to be solved by the instant invention, i.e., to improve web qualities such a bulk through the use of at least one dewatering wire having at least two zones with different wire permeabilities, in which the areas of different wire permeability are small so produce a homogeneous web, Applicants submit that the art of record fails to provide the necessary motivation or rationale for combining the documents in any manner which would render unpatentable Applicants' invention.

Further, Applicants submit that claims 12 - 14 are allowable at least for the reason that these claims depend from allowable base claims and because these claims recite additional features that further define the present invention. In particular, Applicants submit that no proper combination of KAMPS and EATON teaches or suggests, *inter alia*, performing dewatering at a machine speed that is greater than approximately 1300 m/min, as recited in claim 12; the dewatering is performed at greater than approximately 1500 m/min, as recited in claim 13; the dewatering is performed at greater than approximately 1800 m/min, as recited in claim 14.

Accordingly, Applicants request that the Examiner reconsider and withdraw the rejection of claims 12 - 14 under 35 U.S.C. § 103(a) and indicate that these claims are

allowable.

3. Over Kamps in view of Turunen

Applicants traverse the rejection of claims 5, 12 - 14, and 18 under 35 U.S.C. § 103(a) as being unpatentable over KAMPS in view of TURUNEN et al. (U.S. Patent No. 4,144,124) [hereinafter "TURUNEN"].

Applicants note that TURUNEN fails to teach or suggest a dewatering wire having at least two zones with different wire permeabilities in which each at least two zones has at least one dimension of length and width less than 5 mm. Moreover, TURUNEN fails to teach or suggest that the different wire permeabilities of the recited dimension are formed by warp and weft threads.

As both applied documents fail to teach or suggest at least the above-noted features, Applicants submit that no proper combination of these documents can render unpatentable the combination of features recited in at least independent claims 1 and 11, as now amended.

Moreover, as neither document provides any suggestion of the problem sought to be solved by the instant invention, i.e., to improve web qualities such a bulk through the use of at least one dewatering wire having at least two zones with different wire permeabilities, in which the areas of different wire permeability are small so produce a homogeneous web, Applicants submit that the art of record fails to provide the necessary motivation or rationale for combining the documents in any manner which would render the instant invention

unpatentable.

Further, Applicants submit that claims 5, 12 - 14, and 18 are allowable at least for the reason that these claims depend from allowable base claims and because these claims recite additional features that further define the present invention. In particular, Applicants submit that no proper combination of KAMPS and TURUNEN teaches or suggests, *inter alia*, said former comprises a double wire former, as recited in claim 5; performing dewatering at a machine speed that is greater than approximately 1300 m/min, as recited in claim 12; the dewatering is performed at greater than approximately 1500 m/min, as recited in claim 13; the dewatering is performed at greater than approximately 1800 m/min, as recited in claim 14; and the former comprises a double wire former, as recited in claim 18.

Accordingly, Applicants request that the Examiner reconsider and withdraw the rejection of claims 5, 12 - 14, and 18 under 35 U.S.C. § 103(a) and indicate that these claims are allowable.

4. <u>Over Kamps in view of any of Kotitschke, Eaton, Turunen and further in view of SE</u>

'053 or Hayes

Applicants traverse the rejection of claims 1 - 24 under 35 U.S.C. § 103(a) as being unpatentable over KAMPS in view of any of KOTITSCHKE, EATON, or TURUNEN, and further in view of SE 427053 [hereinafter "SE '053"] or HAY et al. (U.S. Patent No. 6,237,644) [hereinafter "HAY"].

Applicants note that, while HAY and SE '053 disclose various belts or wires formed with various weave patterns, neither document provides any teaching or suggestion that these belts or wires include at least two zones having different wire permeabilities, nor is there any suggestion in either document that the warp and weft threads form such zones of different wire permeability. The disclosure in each document is related to the weave pattern, and there is no suggestion that zones of different wire permeability are formed by the disclosed weave.

Further, Applicants note that neither HAY nor SE '053 provide any teaching or suggestion of the recited dimensions of the areas of different permeability, as recited in at least independent claims 1 and 11.

Moreover, Applicants note that, as noted by the Examiner, HAY discloses a forming fabric to produce a patterned fibrous web. As discussed *infra* and in the instant application, a patterned web is neither the intention nor the result of the instant invention, which seeks to improve the noted physical web properties. Thus, Applicants submit that the production of a patterned web by HAYS further indicates that the recited dimensions for the areas of different permeabilities are neither taught nor suggested.

Because none of the applied documents provide any teaching or suggestion of the above-noted features, Applicants submit that no proper combination of these documents can render the combination of features recited in at least independent claims 1 and 11 unpatentable.

While certain specific design features of the belts are described, Applicants submit that the applied documents certainly fail to identify the problem to be solved by the instant amendment, i.e., to enhance physical properties of the web. Thus, as it appears that the variously disclosed weave patterns of SE '053 and HAYES are provided merely to give a desired appearance to the finished web, Applicants submit that there is no teaching or suggestion of the recited dimensions of the small areas of different permeabilities. As there is no suggestion of having any effect on physical parameters of the finished web, Applicants submit that the art of record fails to provide the necessary motivation or rationale to render combine these documents in any manner that would render the instant invention obvious.

Applicants further note that, while the inventors of the instant invention appreciated the fact that the weave patterns identified by SE '053 and/or HAYES for producing a patterned web provide different wire permeabilities, there is no suggestion in either cited document of this feature. Moreover, Applicants note that neither SE '053 nor HAYS teach or suggest utilizing their wires in the manner recited in the instant invention, or to include the recited dimensions for the areas of different permeabilities. Thus, Applicants submit that the art of record fails to provide any teaching or suggestion for combining the art of record in any manner that would render the instant invention unpatentable.

Further, Applicants submit that claims 2 - 10 and 12 - 24 are allowable at least for the reason that these claims depend from allowable base claims and because these claims recite

additional features that further define the present invention. In particular, Applicants submit that no proper combination of KAMPS, KOTITSCHKE, EATON, TURUNEN, SE '053, and HAYES teaches or suggests, inter alia, said at least one dewatering wire is provided in an initial dewatering region, as recited in claim 2; a former which includes a forming element and two circulating, continuous dewatering belts, at least one of which comprises said at least one dewatering wire with at least two different wire permeabilities, said two circulating belts being arranged to converge to form a stock inlet nip, and then being guided over said forming element, as an outer belt, which does not come into contact with said forming element and as an inner belt, wherein at least one of said outer belt and said inner belt comprise said at least one dewatering wire with at least two different wire permeabilities, and a suction device is arranged at a separation point between said two circulating belts in which the tissue web is transferred from said at least one dewatering wire with at least two different permeabilities to the other of said two circulating belts, as recited in claim 3; said forming element comprises a forming roll, as recited in claim 4; said former comprises a double wire former, as recited in claim 5; said former comprises a crescent former, wherein said outer belt is formed by said at least one dewatering wire with at least two different wire permeabilities and wherein said inner belt is formed by a felt belt, as recited in claim 6; said at least one dewatering wire comprises a woven material formed of warp and weft threads, as recited in claim 7; said at least two zones of different wire permeabilities of said at least one

dewatering wire are formed by weaving threads of at least one of different diameter and different weaving pattern, as recited in claim 8; a conditioning device assigned to said at least one dewatering wire, as recited in claim 9; said conditioning device comprises a wire cleaning device, as recited in claim 10; performing dewatering at a machine speed that is greater than approximately 1300 m/min, as recited in claim 12; the dewatering is performed at greater than approximately 1500 m/min, as recited in claim 13; the dewatering is performed at greater than approximately 1800 m/min, as recited in claim 14; using the at least one dewatering wire in an initial dewatering region, as recited in claim 15; the use of a former which includes a forming element and two circulating, continuous dewatering belts, at least one of which comprises said at least one dewatering wire with at least two different wire permeabilities; the two circulating belts being arranged to converge to form a stock inlet nip, and then being guided over the forming element, as an outer belt, which does not come into contact with the forming element and as an inner belt, wherein at least one of the outer belt and the inner belt comprise the at least one dewatering wire with at least two different wire permeabilities, and a suction device is arranged at a separation point between the two circulating belts in which the tissue web is transferred from the at least one dewatering wire with at least two different permeabilities to the other of the two circulating belts, as recited in claim 16; the forming element comprises a forming roll, as recited in claim 17; the former comprises a double wire former, as recited in claim 18 the former comprises a crescent

former, wherein the outer belt is formed by a dewatering wire with at least two different wire permeabilities and wherein the inner belt is formed by a felt belt, as recited in claim 19; the at least one dewatering wire comprises a woven material formed of warp and weft threads, as recited in claim 20; the at least two zones of different wire permeabilities of the at least one dewatering wire are formed by weaving threads comprising at least one of different diameter and different weaving pattern, as recited in claim 21; at least one dewatering wire is used in a region in which a dry content of the tissue web is less than approximately 20%, as recited in claim 22; the dry content of the tissue web is less than approximately 12%, as recited in claim 23; the at least one dewatering wire is used in an initial sheet forming region at a dry content less than approximately 6%, as recited in claim 24.

Accordingly, Applicants request that the Examiner reconsider and withdraw the rejection of claims 1 - 24 under 35 U.S.C. § 103(a) and indicate that these claims are allowable.

Application is Allowable

Thus, Applicants respectfully submit that each and every pending claim of the present invention meets the requirements for patentability under 35 U.S.C. §§ 102 and 103, and respectfully request the Examiner to indicate allowance of each and every pending claim of the present invention.

Authorization to Charge Deposit Account

The Commissioner is authorized to charge to Deposit Account No. 19 - 0089 any

necessary fees, including any extensions of time fees required to place the application in

condition for allowance by Examiner's Amendment, in order to maintain pendency of this

application.

CONCLUSION

In view of the foregoing, it is submitted that none of the references of record, either

taken alone or in any proper combination thereof, anticipate or render obvious the Applicants'

invention, as recited in each of claims 1 - 26. The applied references of record have been

discussed and distinguished, while significant claimed features of the present invention have

been pointed out.

Further, any amendments to the claims which have been made in this response and

which have not been specifically noted to overcome a rejection based upon the prior art,

should be considered to have been made for a purpose unrelated to patentability, and no

estoppel should be deemed to attach thereto.

Accordingly, reconsideration of the outstanding Office Action and allowance of the

present application and all the claims therein are respectfully requested and now believed to

be appropriate.

Respectfully submitted,

Thomas Thoroe SCHERB et al-

Neil F. Greenblum

Reg. No. 28,3947

- 22 -

September 25, 2002 GREENBLUM & BERNSTEIN, P.L.C. 1941 Roland Clarke Place Reston, VA 20191 (703) 716-1191

<u>APPENDIX</u>

Marked-Up Copies of the Amended Claims:

1. (Twice amended) A machine for producing a tissue web, comprising: a forming region with at least one circulating, continuous dewatering wire,

wherein said dewatering wire comprises at least two zones having different wire permeabilities formed by warp and weft threads, and each at least two zones has at least one dimension of length and width less than 5 mm.

3. (Twice amended) The machine according to claim 1, further comprising a former which includes a forming element and two circulating, continuous dewatering belts, at least one of which comprises said at least one dewatering wire with at least two different wire permeabilities;

said two circulating belts being arranged to converge to form a stock inlet nip, and then being guided over said forming element, as an outer belt, which does not come into contact with said forming element and as an inner belt, wherein at least one of said outer belt and said inner belt comprise said at least one dewatering wire with at least two different wire permeabilities; and

a suction device is arranged at a separation point between said two circulating belts in which the tissue web is transferred from said at least one dewatering wire with at least two different permeabilities to the other of said two circulating belts.

11. (Twice amended) A process for producing a tissue web in a tissue machine,

the process comprising:

forming the tissue web in a forming region of the tissue machine on at least one circulating, continuous dewatering wire comprising at least two zones having different wire permeabilities formed by warp and weft threads, wherein each at least two zones has at least one dimension of length and width of less than 5 mm.

16. (Twice amended) The process according claim 11, further comprising the use of a former which includes a forming element and two circulating, continuous dewatering belts, at least one of which comprises said at least one dewatering wire with at least two different wire permeabilities; the two circulating belts being arranged to converge to form a stock inlet nip, and then being guided over the forming element, as an outer belt, which does not come into contact with the forming element and as an inner belt, wherein at least one of the outer belt and the inner belt comprise the at least one dewatering wire with at least two different wire permeabilities; and

a suction device is arranged at a separation point between the two circulating belts in which the tissue web is transferred from the at least one dewatering wire with at least two different permeabilities to the other of the two circulating belts.